FEDERAL RAILROAD ADMINISTRATION

OFFICE OF RAILROAD SAFETY



Continuous Welded Rail Enforcement Guidance Manual

September 2011

This document is intended only to provide guidance to FRA track inspectors. Any legal proceeding instituted against a railroad for failure to comply with the Federal Track Safety Standards must be based on Title 49 Code of Federal Regulations Part 213. This document is not to be construed as a modification, alteration, or revision of the published regulations. The guidance provided in this manual may be revoked or modified without notice by memorandum of the Associate Administrator for Railroad Safety/Chief Safety Officer.

Introduction

This is the first edition of the Federal Railroad Administration (FRA) Continuous Welded Rail (CWR) Reference Manual. This CWR manual is compiled for use by employees of FRA (and by employees of a State agency participating in investigative or surveillance activities under Part 212 of Title 49 of the Code of Federal Regulations (CFR)) in the enforcement of 49 CFR Part 213, Track Safety Standards (TSS).

This manual primarily focuses on the amendments made to the TSS regarding CWR by the final rule published on August 25, 2009, in the Federal Register at 74 FR 42988. In this final rule, FRA promulgated specific requirements for the qualification of persons designated to inspect CWR track, or supervise the installation, adjustment, or maintenance of CWR track. FRA also clarified the procedures associated with the submission of CWR plans to FRA by track owners. The final rule specifies that these plans should add focus on inspecting CWR for pull-apart prone conditions, and on CWR joint installation and maintenance procedures. A correcting amendment, which was published on October 21, 2009, added compliance dates for railroads that had been inadvertently omitted from the final rule's compliance schedule. In addition, in response to a petition for reconsideration of the August 2009 CWR final rule, FRA published a final rule amending the definitions of "adjusting/de-stressing" and "buckling-prone condition" as they are used with regard to CWR. See 75 FR 4703 (January 29, 2010).

It should be noted that FRA published a final rule in 2006 that addressed revisions made to the inspection of joints on CWR; however, this final rule is broader in nature, as it addresses all of the provisions of 49 CFR Section 213.119 (not just those dealing with the inspection of CWR joints).

This manual is organized by the Part 213 section that was amended or added. Each section describes the changes or additions made. At the end of the manual are two appendices. Appendix A to the manual (which is different than Appendix A to Part 213) is an unofficial copy (for reference purposes only) of the CWR Joint Bar Fracture Report form required to be completed by § 213.119(h)(7)(ii). As discussed later in the guidance for this section, railroads wishing to submit the form in hard copy should use the official fracture report form that is available for download (at http://safetydata.fra.dot.gov/CWR/), rather than this unofficial copy. Appendix B to the manual shows the August 25, 2009, amendments that were made to the schedule of civil penalties in Appendix B to Part 213.

§ 213.7 Designation of Qualified Persons to Supervise Certain Renewals and Inspect Track

- (a) Each track owner to which this part applies shall designate qualified persons to supervise restorations and renewals of track under traffic conditions. Each person designated shall have—
- (1) At least—
- (i) I year of supervisory experience in railroad track maintenance; or
- (ii) A combination of supervisory experience in track maintenance and training from a course in track maintenance or from a college level educational program related to track maintenance:
- (2) Demonstrated to the owner that he or she—
- (i) Knows and understands the requirements of this part;
- (ii) Can detect deviations from those requirements; and
- (iii)Can prescribe appropriate remedial action to correct or safely compensate for those deviations; and
- (3) Written authorization from the track owner to prescribe remedial actions to correct or safely compensate for deviations from the requirements in this part.
- (b) Each track owner to which this part applies shall designate qualified persons to inspect track for defects. Each person designated shall have—
- (1) At least—
- (i) I year of experience in railroad track inspection; or
- (ii) A combination of experience in track inspection and training from a course in track inspection or from a college level educational program related to track inspection;
- (2) Demonstrated to the owner that he or she—
- (i) Knows and understands the requirements of this part;
- (ii) Can detect deviations from those requirements; and
- (iii) Can prescribe appropriate remedial action to correct or safely compensate for those deviations; and
- (3) Written authorization from the track owner to prescribe remedial actions to correct or safely compensate for deviations from the requirements of this part, pending review by a qualified person designated under paragraph (a) of this section.

Guidance: Inspectors may request verification of the experience and qualifications of the supervisory and track inspection personnel from a track owner. The submission of a seniority roster or job awarding bulletin is not to be considered as satisfactory identification of qualified employees or as a basis for their designation. The owner should make specific names of individuals and their qualifications available in writing. If the inspector is in doubt as to the qualifications of the owner's supervisory or inspection personnel, the inspector should examine the owner's inspection records. The TSS require the retention of required track inspection reports for 1 year at the owner's division office. Should the records consistently fail to reflect the actual track conditions, questions can be raised as to the competence and/or qualifications of the person(s) included in list.

When in doubt as to the qualifications of an owner's supervisors or inspectors, the inspector should discuss the matter with the railroad.

- (c) Individuals designated under paragraphs (a) or (b) of this section that inspect continuous welded rail (CWR) track or supervise the installation, adjustment, and maintenance of CWR track in accordance with the written procedures of the track owner shall have:
- (1) Current qualifications under either paragraph (a) or (b) of this section;
- (2) Successfully completed a comprehensive training course specifically developed for the application of written CWR procedures issued by the track owner;
- (3) Demonstrated to the track owner that the individual:
- (i) Knows and understands the requirements of those written CWR procedures;
- (ii) Can detect deviations from those requirements; and
- (iii) Can prescribe appropriate remedial action to correct or safely compensate for those deviations: and
- (4) Written authorization from the track owner to prescribe remedial actions to correct or safely compensate for deviations from the requirements in those procedures and successfully completed a recorded examination on those procedures as part of the qualification process.

Guidance: As CWR track has characteristics inherently different than those of traditional jointed rail, track owners are required to designate which individuals are specifically qualified to inspect or supervise the installation, adjustment, and maintenance of CWR. In addition to the qualifications that an individual must have under either paragraph (a) or (b), an individual designated under paragraph (c) must have completed a CWR training course and be wellversed in the maintenance of CWR track as detailed in the track owner's CWR plan. The comprehensive nature of the training course is more important than its duration; therefore, the railroad employee must successfully complete an in-depth initial training course of the track owner's written CWR procedures and continue subsequent periodic re-training thereafter, pursuant to the training program required by § 213.343(g). In addition, all individuals qualified on CWR for train operations must successfully complete a recorded examination on the track owner's CWR procedures. This recorded examination may be, for example, a traditional written examination, an electronic file of a computerized interactive training course that concludes with an examination, or a record of a supervisor's oral testing of the employee's knowledge through practical field application. Due to the language of the regulation, track owners have flexibility to test an individual's knowledge to one of the previously stated methods. However, it should be noted that the results of the examination must be recorded so that FRA may inspect the basis for the qualification of an individual under paragraph (c).

(d) Persons not fully qualified to supervise certain renewals and inspect track as required in paragraphs (a) through (c) of this section, but with at least one year of maintenance-of-way or signal experience, may pass trains over broken rails and pull aparts provided that—
(1) The track owner determines the person to be qualified and, as part of doing so, trains, examines, and re-examines the person periodically within two years after each prior examination on the following topics as they relate to the safe passage of trains over broken rails or pull aparts: rail defect identification, crosstie condition, track surface and alinement, gage restraint, rail end mismatch, joint bars, and maximum distance between rail ends over which trains may be allowed to pass. The sole purpose of the examination is to ascertain the person's ability to effectively apply these requirements and the examination may not be used

to disqualify the person from other duties. A minimum of four hours training is required for initial training;

- (2) The person deems it safe and train speeds are limited to a maximum of 10 m.p.h. over the broken rail or pull apart;
- (3) The person shall watch all movements over the broken rail or pull apart and be prepared to stop the train if necessary; and
- (4) Person(s) fully qualified under § 213.7 are notified and dispatched to the location promptly for the purpose of authorizing movements and effecting temporary or permanent repairs.

Guidance: Paragraph (d) allows employees to be qualified for the specific purpose of authorizing train movements over broken rails or pull-aparts. This section requires the employees to have at least 1 year of maintenance-of-way or signal experience and a minimum of 4 hours of training, plus an examination (and periodic re-examination within 2 years of each examination) on requirements related to the safe passage of trains over broken rails and pull-aparts. The purpose of the examination is to ascertain the person's ability to effectively apply these requirements. A railroad may use the examination to determine whether a person should be allowed to authorize train movements over broken rails or pull-aparts.

The maximum speed over broken rails and pull-aparts shall not exceed 10 mph. However, movement authorized by a person qualified under this subsection may further restrict speed, if warranted by the particular circumstances. The person qualified under this paragraph must be present at the site and able to instantly communicate with the train crew so that the movement can be stopped immediately, if necessary.

Fully qualified persons under § 213.7 must be notified and dispatched to the location promptly to assume responsibility for authorizing train movements and effecting repairs. The word "promptly" is meant to provide the railroad with flexibility to pass trains over the condition prior to the time the fully qualified person would report to the scene. Railroads may permit persons qualified under § 213.7(d) to authorize multiple train movements over such conditions, but the person qualified under § 213.7(d) must examine the broken rail or pull-apart area initially, and before each subsequent movement, to ensure the location is safe for the passage of the next train.

- (e) With respect to designations under paragraphs (a) through (d) of this section, each track owner shall maintain written records of—
- (1) Each designation in effect;
- (2) The basis for each designation; and
- (3) Track inspections made by each designated qualified person as required by § 213.241. These records shall be kept available for inspection or copying by the Federal Railroad Administration during regular business hours.

Guidance: Failure of the owner to have and maintain written records designating employees and the basis for each designation is a deviation from the TSS. Incomplete qualification records would also constitute a deviation from the standards. Designated employees include supervisors, inspectors, and those partially qualified to pass trains over broken rails and pull-

aparts. Inspectors are also instructed to note that incomplete qualification records may not reflect the actual qualification of an individual. As such, a record deficiency shall not be the sole basis for a defect or civil penalty recommendation for not having a qualified designated person performing these functions. If there are questions about the qualifications of an individual, it will be necessary for the inspector to interview railroad or contractor employees.

§ 213.118 Continuous welded rail (CWR); plan review and approval.

- (a) Each track owner with track constructed of CWR shall have in effect and comply with a plan that contains written procedures which address: the installation, adjustment, maintenance, and inspection of CWR; inspection of CWR joints; and a training program for the application of those procedures.
- (b) The track owner shall file its CWR plan with the FRA Associate Administrator for Railroad Safety/Chief Safety Officer (Associate Administrator). Within 30 days of receipt of the submission, FRA will review the plan for compliance with this subpart. FRA will approve, disapprove or conditionally approve the submitted plan, and will provide written notice of its determination.
- (c) The track owner's existing plan shall remain in effect until the track owner's new plan is approved or conditionally approved and is effective pursuant to paragraph (d) of this section. (d) The track owner shall, upon receipt of FRA's approval or conditional approval, establish the plan's effective date. The track owner shall advise in writing FRA and all affected employees of the effective date.
- (e) FRA, for cause stated, may, subsequent to plan approval or conditional approval, require revisions to the plan to bring the plan into conformity with this subpart. Notice of a revision requirement shall be made in writing and specify the basis of FRA's requirement. The track owner may, within 30 days of the revision requirement, respond and provide written submissions in support of the original plan. FRA renders a final decision in writing. Not more than 30 days following any final decision requiring revisions to a CWR plan, the track owner shall amend the plan in accordance with FRA's decision and resubmit the conforming plan. The conforming plan becomes effective upon its submission to FRA.

Guidance: All CWR plans must be submitted to FRA for review by the Track Division and then approval by the Associate Administrator. FRA reviews each plan for compliance with §§ 213.119 (a) through (l). Regional Track specialists may be requested to provide recommendations concerning the comprehensiveness of those procedures.

When conducting track inspections, an FRA inspector should have with him the most recent copy of a railroad's CWR plan. This is important because it will enable the inspector to perform a proper inspection and determine compliance with the plan. Finalized CWR plans are posted on the FRA secured Web site for the inspector's review and enforcement. If an inspector discovers substantial discrepancies between the official plan on file at FRA headquarters and the plan in the field (or that there are substantial discrepancies between the official plan on file with FRA and a railroad field manual), the inspector should notify the regional Track specialist.

FRA may also conditionally approve a plan. There might be instances where it would be beneficial for the agency to conditionally approve a plan. For example, FRA might decide that a plan should be approved, but might need to look into new technology proposed in the plan. FRA reserves the ability to later approve or disapprove a plan that it has formally conditionally approved.

A track owner may update or modify CWR procedures as necessary, but must re-submit any new or modified plan to FRA pursuant to § 213.118. Until the new plan is approved or conditionally approved and effective pursuant to paragraph (d), the track owner's existing plan will remain in effect.

§ 213.119 Continuous welded rail (CWR); plan contents.

Guidance, General: In addition to safety-critical procedures listed in this section, the railroad may decide to include procedures based on administrative or economic considerations. For example, a railroad may choose to include instructions that limit the use of worn secondhand replacement rail because of an economic concern about the length of time that it might take to perform a satisfactory weld. The railroad may also include specific actions in their procedures that are to be taken when installation or maintenance work does not comply with its overall procedures.

Recording an activity that does not conform to the railroad's CWR procedures does not provide the railroad with indefinite relief from responsibility for compliance when its procedures are not followed. Continued noncompliance may lead to an unsafe condition. The recordkeeping procedure is intended to provide a safety net by flagging those activities of noncompliance, which, if not brought into compliance in a timely manner, could lead to an unsafe condition. For example, CWR installed in the winter months without adequate rail anchors as prescribed by the written procedures and discovered in late summer would clearly be a deficient condition, regardless of if it was recorded. When in doubt as to what activities are considered safety related, the inspector should consult with the regional Track specialist.

Whenever conducting inspections on a railroad and that activity includes observation of CWR, FRA inspectors are to include only one "CWRP" unit on the header of their Railroad Inspection System for Personal Computers (RISPC) inspection report. Record one CWRP unit, regardless of the amount of CWR mileage inspected. Record the actual track mileage units using the activity codes MTH, MTW, etc. When a defect is taken for any aspect of § 213.119, FRA inspectors are to also designate CWRP for the line item "activity" cell. In addition, inspectors are to use CWRP in each line item activity cell when performing records inspections and recording deficiencies concerning CWR joint records.

The definition of a "buckling incident" explains the industry definition for such an event. However, the rule recognizes the importance of conditions that are precursors to buckles.

The two failure modes associated with track constructed with CWR are track buckles and pull-aparts. A track buckle is considered the more serious of the two and is characterized by the formation of a large lateral misalinement caused by:

- High compressive forces in the rail (thermal and mechanical loads).
- Weakened track conditions (weak track resistance, alinement deviations).
- Vehicle loads (a dynamic "wave" uplift and lateral vs. vertical ratios).

The track owner shall comply with the contents of the CWR plan approved or conditionally approved under § 213.118. The plan shall contain the following elements—

- (a) Procedures for the installation and adjustment of CWR which include—
- (1) Designation of a desired rail installation temperature range for the geographic area in which the CWR is located; and
- (2) De-stressing procedures/methods which address proper attainment of the desired rail installation temperature range when adjusting CWR.

Guidance: Track owners with track constructed of CWR are required to have in effect and comply with a CWR plan. This includes track owners who operate entirely on CWR track that has been designated as excepted track, pursuant to § 213.4. The procedures under § 213.119 do not apply to excepted track. (See § 213.5(b)). However, where a railroad designates a segment of track as excepted, it still must meet the requirements of at least Class 1 track for any portion of that track that is: (1) located within 30 feet of an adjacent track that is subjected to simultaneous use at speeds in excess of 10 mph, or (2) located on a bridge or on a public street or highway and there are trains with placarded cars. (See § 213.4(d)).

Railroads typically establish a desired rail installation temperature range for the geographical area that is higher than the annual mean temperature. This higher installation temperature will account for the expected reduction of the force-free temperature caused by track maintenance, train traffic, and other factors. As reference, the term for this expected occurrence is "rail neutral temperature shift." A railroad's failure to establish a designated installation temperature range for a specific territory is addressed under § 213.119(a).

- (b) Rail anchoring or fastening requirements that will provide sufficient restraint to limit longitudinal rail and crosstie movement to the extent practical, and specifically addressing CWR rail anchoring or fastening patterns on bridges, bridge approaches, and at other locations where possible longitudinal rail and crosstie movement associated with normally expected train-induced forces, is restricted.
- (c) CWR joint installation and maintenance procedures which require that—
- (1) Each rail shall be bolted with at least two bolts at each CWR joint;

Guidance: The track inspector should determine that any joint(s) installed in CWR or connecting to CWR must have at least two bolts in each rail end, a minimum of four bolts installed in the joint bars, if not field welded at the time of installation. § 213.121(e).

This requirement serves as a reminder to track owners that they cannot create their own joint bolt requirements in their CWR plans that are less restrictive than those specified in the TSS.

- (2) In the case of a bolted joint installed during CWR installation after October 21, 2009, the track owner shall either, within 60 days—
- (i) Weld the joint;
- (ii) Install a joint with six bolts; or
- (iii) Anchor every tie 195 feet in both directions from the joint; and

Guidance: This section applies to major installations of CWR, such as more than 400 feet. It is not intended for plug rails. Note that the applicability date published in the final rule for this section (August 25, 2009) was corrected via the amendment published on October 21, 2009, at 74 FR 53889.

(3) In the case of a bolted joint in CWR experiencing service failure or a failed bar with a rail gap present, the track owner shall either—

Guidance: This section addresses CWR joints that experience a failure with a rail gap present. The definition for rail gap for this section is that the rail is under tension. An example of a joint failure under tension is a joint where the rail ends could not be pulled back together manually, as with the use of a drift pin, or if mechanical or thermal assistance is needed. A remedial action from § 213.119(c)(3) must be taken. Check for evidence of tension (such as bent and broken bolts) or application of thermal force (heat from repair rope, sawdust, or flammable mix).

(i) Weld the joint;

Guidance: The rail is welded at the time the joint is repaired.

(ii) Replace the broken bar(s), replace the broken bolts, adjust the anchors and, within 30 days, weld the joint;

Guidance: The 30-day time limit is only to allow the railroad adequate time to gather resources to weld the joint. If a CWR joint becomes battered before a repair can be completed and the track owner decides to cut in a plug rail to remove the battered joint, the track must immediately be brought into compliance as specified in § 213.121(e). The 30-day time limit starts from the original joint installation date for both joints. The remedial action 30-day period does not begin again when both CWR rail joints are required to be removed. If the joints have not been welded on the 31st day, a violation may be submitted to the track owner for failure to take the appropriate remedial action. The track owner must have selected the planned remedial action to be taken on the inspection report or other documentation that may be addressed in the CWR plan at the time the defect was discovered, and it must be documented. This written or electronic documentation must be made available upon request by FRA during regular business hours.

- (iii) Replace the broken bar(s), replace the broken bolts, install one additional bolt per rail end, and adjust anchors;
- (iv) Replace the broken bar(s), replace the broken bolts, and anchor every tie 195 feet in both directions from the CWR joint; or
- (v) Replace the broken bar(s), replace the broken bolts, add rail with provisions for later adjustment pursuant to paragraph (d)(2) of this section, and reapply the anchors.

Guidance: The track owner should ensure that any rail added during the repair of a CWR pull-apart is properly adjusted back to the required safe neutral temperature in accordance with the railroad's CWR plan. As the rail temperature rises, the expansion of rail increases. The track owner must have provisions in the CWR plan to slow order the affected track and make repairs and adjustment to bring the track into compliance. For example, in many cases, the addition of 1 inch of rail in a 1,000-foot string of CWR will lower its rail neutral temperature by 13 degrees.

If the remedial actions described in §§ 213.119(c)(iii), (iv), or (v) are used and the affected joint fails again (with a rail gap present after the initial repair), additional, more restrictive repairs are required. This shows that the rail tension was not adequately addressed during the initial remedial action. CWR joints must be inspected for compliance with additional parts of the TSS, such as tie condition, surface, rail end mismatch, and properly fitting joint bars.

- (d) Procedures which specifically address maintaining a desired rail installation temperature range when cutting CWR including rail repairs, in-track welding, and in conjunction with adjustments made in the area of tight track, a track buckle, or a pull-apart. Rail repair practices shall take into consideration existing rail temperature so that—
- (1) When rail is removed, the length installed shall be determined by taking into consideration the existing rail temperature and the desired rail installation temperature range; and
- (2) Under no circumstances should rail be added when the rail temperature is below that designated by paragraph (a)(1) of this section, without provisions for later adjustment.
- (e) Procedures which address the monitoring of CWR in curved track for inward shifts of alinement toward the center of the curve as a result of disturbed track.

Guidance: Thermal and mechanical loads affecting track structure are decreased by the track owner's adherence to the track engineering standards. Adherence to the track owner's standards and the CWR plan promote CWR track stability and safety. Three engineering elements resist mechanical loads and thermal loads: lateral resistance, longitudinal resistance, and rail neutral temperature. Track buckles can be expected to occur predominately in the lateral dimension. Lateral resistance is critical to being dependent upon weight and size of crosstie material, ballast material type, shoulder width, crib content, and its level of consolidation. As degree of curvature increases, the buckling resistance decreases.

A crosstie's base, side (crib) friction, and ballast shoulder resistance contribute to the overall lateral resistance sustained. In general, each contributes (base 50 percent, side 20–30 percent, and shoulder 20–30 percent) to this resistance, but the ratios can vary depending on ballast condition. Lateral resistance varies in location depending on the ballast shoulder geometry, crosstie size and type, and state of ballast consolidation.

Thermal loads by themselves can cause a buckle and are often called "static buckling." However, most buckling occurs under a combination of thermal and vehicle loads, termed "dynamic buckling." Inspectors should place emphasis on vehicle (dynamic) effects on track lateral stability, where high rail temperatures and vehicle loading could progressively weaken the track due to dynamic uplift (flexural waves) and a buckle mechanism response induced by misalignment "growth."

Because the majority of buckles occur under dynamic train movements, loading is an important element in the buckling mechanism. Elements of track lateral instability include:

- Formation of initial track misalinement caused by reduced local resistance.
- High impact loads, initial rail surface (weld) imperfections, "soft" spots in ballast, and curve (radial breathing) shifting.
- Misalinement growth caused by high lateral loads, increased longitudinal forces, track uplifts due to vertical loads, and train-induced vibration.

Inspectors may consider the above elements combined with related evidence of actual defects, geometry conditions, or other defective structural conditions when evaluating the adequacy of a railroad's CWR stability procedures under §§ 213.119(b), (c), (d), and (e). Locations where track buckling are more likely to occur include: horizontal and vertical curves, bottom of grades, bridge approaches, highway-rail grade crossings, recently-disturbed track, and areas of heavy train starting or braking.

The signs or precursors of buckles include:

- Newly-formed alinement deviations: wavy, kinky, snaky, etc.
- Rails rotating or lifting out of the tie plates and intermittent loose tie plates.
- Excessive "running" rail causing ties to plow or churn the ballast.
- Insufficient anchors and anchors not installed tightly against the tie.
- Insufficient ballast section in the crib and shoulder areas.
- Gaps at crosstie ends, especially on the low (inner) rail.

Curves are more prone to buckling because of the curvature effect, alinement imperfection sensitivity, and train loads. It is important for inspectors to consider when and where a buckle may occur (e.g., on track segments where the CWR installation occurred below the desired rail installation temperature range and there was inadequate control of the laying temperature or inadequate adjustment of the rail afterwards). In addition, inspectors should observe areas of recent maintenance involving either the ballast or rail, where there was inadequate reconsolidating time for a disturbed ballast or inadequate temperature adjustment when replacing a defective rail. As curvature increases, the buckling resistance decreases. Under some conditions, high degree curvature can undergo gradual lateral shift (progressive buckling). Lateral alinement deviations reduce the track buckling strength and can initiate growth to critical levels. Vertical alinement deviations can also influence buckling.

Lateral misalinement is an important consideration because it reduces the ability of the track to resist buckling. An alinement offset or mid-ordinate within allowable limits may "escalate" under the imposed loads. This is called "track shift." A longitudinal force in curved track will cause CWR rail to move radically. Compressive loads in the rail during the summer tend to move the track outwards, and tensile loads in the winter will pull the track inward, a term known as "radial breathing." Inspectors should review the allowable limits, under § 213.55, and evaluate the relevant alinement and track strength (§ 213.13, Movement under load) due to repeated thermal and vehicle loadings.

Generally speaking, a decrease in the rail neutral temperature of 30–40 degrees from the installation temperature can be critical and lead directly to buckling. Inspectors should monitor the following factors that may influence shifts in the force-free temperature: improper rail installation, inadequate rail anchors or fastenings, lateral movements in curves through lining operations, "skeletonized" track segments (ballast removed for maintenance purposes), and inadequate ballast section. Lateral and longitudinal restraint is influenced by the factors mentioned above and, if improperly maintained or allowed to exist in a defective state, it increases the opportunity for a track buckle.

Track buckles occur less frequently in tangent track than in curves. However, buckling in tangent track will generally occur suddenly and with more severe consequences.

The second of the two failure modes that can be associated with track constructed with CWR is a pull-apart. A rail's decrease in temperature in the winter will create tensile forces. The maximum tensile load in the rail is determined by the difference in the installation or force-free temperature and the lowest rail temperatures. Enough tensile force can cause direct fracture at rail cross-sections with prior cracks, weak welds, or sheared joint bolts at CWR string end locations.

- (f) Procedures which govern train speed on CWR track when—
- (1) Maintenance work, track rehabilitation, track construction, or any other event occurs which disturbs the roadbed or ballast section and reduces the lateral or longitudinal resistance of the track; and
- (2) The difference between the average rail temperature and the average rail neutral temperature is in a range that causes buckling-prone conditions to be present at a specific location; and

Guidance: This requires that the railroad needs to record the new rail neutral temperature when performing rail repair and installation.

- (3) In formulating the procedures under paragraphs (f)(1) and (f)(2) of this section, the track owner shall—
- (i) Determine the speed required, and the duration and subsequent removal of any speed restriction based on the restoration of the ballast, along with sufficient ballast reconsolidation to stabilize the track to a level that can accommodate expected train-induced forces. Ballast re-consolidation can be achieved through either the passage of train tonnage or mechanical stabilization procedures, or both; and

- (ii) Take into consideration the type of crossties used.
- (g) Procedures which prescribe when physical track inspections are to be performed.
- (1) At a minimum, these procedures shall address inspecting track to identify—
- (i) Buckling-prone conditions in CWR track, including—
- (A) Locations where tight or kinky rail conditions are likely to occur; and
- (B) Locations where track work of the nature described in paragraph (f)(1)(i) of this section has recently been performed; and
- (ii) Pull-apart prone conditions in CWR track, including locations where pull-apart or stripped-joint rail conditions are likely to occur; and
- (2) In formulating the procedures under paragraph (g)(1) of this section, the track owner shall—
- (i) Specify when the inspections will be conducted; and
- (ii) Specify the appropriate remedial actions to be taken when either buckling-prone or pull-apart prone conditions are found.
- (h) Procedures which prescribe the scheduling and conduct of inspections to detect cracks and other indications of potential failures in CWR joints. In formulating the procedures under this paragraph, the track owner shall—

Guidance: This paragraph requires each track owner to include in its CWR plan provisions for the scheduling and conducting of joint inspections. A person who is qualified under § 213.7(c) will perform the inspections required by this paragraph on foot at the joint.

(1) Address the inspection of joints and the track structure at joints, including, at a minimum, periodic on-foot inspections.

Guidance: This paragraph governs on-foot periodic inspections of CWR joints. Track owners are required to establish procedures for conducting these inspections. Upon identifying actual conditions of joint failures (i.e., broken or cracked joints bars) or potential conditions of joint failure, track owners must initiate the appropriate corrective action and keep the appropriate records. See §§ 213.119(h)(5) and 213.119(h)(7). In addition, when a track owner discovers CWR joints that are not in compliance with the requirements of the TSS, the track owner must take the appropriate remedial action required by Part 213. Inspectors should note that nothing in this paragraph interferes with the track owners' continuing obligation to conduct track inspections under § 213.233. In addition, on-foot periodic inspections can be performed concurrently with § 213.233.

Periodic inspections, as referenced herein, are on-foot inspections of CWR joints that track owners must conduct on a regular basis. Track owners are required to conduct on-foot periodic inspections at the minimum intervals specified in paragraph (h)(6). Track owners, of course, are free to conduct these inspections more frequently than required.

(2) Identify joint bars with visible or otherwise detectable cracks and conduct remedial action pursuant to § 213.121;

Guidance: This paragraph requires track owners to identify joint bars with visible or otherwise detectable cracks and conduct remedial action pursuant to § 213.121. Railroad

inspectors must know to distinguish between joint bars that are already cracked and joint bars that have the potential of cracking in the future. When a track owner discovers a cracked joint bar, the owner must take any remedial action specified in § 213.121; however, if the owner discovers a joint bar with actual or potential joint failure, the owner must take the corrective action specified by the CWR plan. Corrective action will be further addressed in paragraph (h)(5).

- (3) Specify the conditions of actual or potential joint failure for which personnel must inspect, including, at a minimum, the following items:
- (i) Loose, bent, or missing joint bolts;
- (ii) Rail end batter or mismatch that contributes to instability of the joint; and (iii) Evidence of excessive longitudinal rail movement in or near the joint, including, but not limited to; wide rail gap, defective joint bolts, disturbed ballast, surface deviations, gap between tie plates and rail, or displaced rail anchors;

Guidance: This paragraph identifies those items relating to joint inspections that track owners must address in their CWR plans. Inspectors should note that these items are the minimum that track owners should address. Of course, track owners are free to include additional items in their respective CWR plans. Railroad track inspectors are to identify and record action items listed during their inspection of joints because these items are related to the integrity of the joint, and thus, to the safety of trains that operate over these joints.

Inspectors should note that this list is not all-inclusive. There are other conditions that could indicate failure, and inspectors should urge track owners to consider all conditions, not just these listed examples.

(4) Specify the procedures for the inspection of CWR joints that are imbedded in highway-rail crossings or in other structures that prevent a complete inspection of the joint, including procedures for the removal from the joint of loose material or other temporary material;

Guidance: This paragraph requires track owners to include procedures in their CWR plans for the inspection of CWR joints that are imbedded in highway-rail grade crossings or in other structures that prevent a complete inspection of the joint (e.g., pans in fueling facilities, scales, passenger walkways at stations that cover the track, etc.). The plans must also include procedures for the removal of loose material or other temporary material from the joint.

With respect to the procedures for "imbedded" joints, inspectors should not expect railroads to disassemble or remove the track structure (e.g., remove pavement or crossing pads) to conduct an inspection of CWR joints. However, FRA expects that railroads will make every effort, to the extent practicable, to inspect the joints in these structures.

Inspectors need to be aware that CWR joints may sometimes be temporarily buried during maintenance (*e.g.* where ballast is distributed in the middle of the track and along the track) and therefore unavailable for inspection. FRA expects that railroads will take necessary measures to conduct inspections of these CWR joints and expects that railroads will schedule their maintenance to allow for a complete inspection of these joints. Where CWR joints are

buried (e.g., by ballast), inspectors should understand that railroad maintenance personnel will wait for the completion of the track surfacing and dressing of the ballast before conducting their joint bar inspections. However, railroad employees may use hand tools or mechanical means to remove ballast from the sides of track joints, so that they can conduct an inspection of those track joints.

Finally, FRA notes that components of the track (such as crossties, fasteners, tie plates, etc.) are also not fully visible in highway-rail grade crossings and similar structures. Inspectors should note that FRA has never specifically exempted these items from the inspections required under Part 213. Inspectors should continue to expect that the railroads will inspect these areas to the maximum extent possible.

(5) Specify the appropriate corrective actions to be taken when personnel find conditions of actual or potential joint failure, including on-foot follow-up inspections to monitor conditions of potential joint failure in any period prior to completion of repairs;

Guidance: This paragraph requires track owners to specify in their plans the appropriate corrective actions that must be taken when track inspectors find conditions of actual or potential joint failure. Inspectors should note the difference between the terms "remedial actions" and "corrective action" and apply accordingly. Remedial actions are those actions which track owners are required to take as a result of requirements of Part 213 to address a noncompliant condition. For example, if a track owner discovers a cracked joint bar, the owner must replace it. See § 213.121 or the parallel requirement in the railroad's CWR plan. Corrective actions, on the other hand, are those actions that track owners specify in their CWR plans to address conditions of potential joint failure, including, as applicable, repair, restrictions on operations, and/or additional on-foot inspection. To ensure clarity, FRA has defined these terms in § 213.119(j).

On-foot followup inspections, as referenced herein, are joint-specific and conducted in response to conditions that a track owner discovers during periodic inspections. Track owners will identify in their CWR plans the conditions that trigger followup inspections. For example, where a track owner identifies "replace bolt or inspect weekly" as a corrective action for a bent bolt, if a track inspector discovers a bent bolt during a periodic inspection and does not immediately replace it, then the track inspector will have to conduct followup inspections at that joint at the specified frequency (in this case, weekly).

(6) Specify the timing of periodic inspections, which shall be based on the configuration and condition of the joint:

Guidance: This paragraph requires railroad owners to specify the timing of on-foot periodic inspections. The minimum number of required joint inspections is addressed in the table in paragraph (h)(6)(i). The timing periods in this paragraph represent the minimum of what is expected. Railroad owners are encouraged to implement additional inspection periods as they determine necessary.

In paragraphs (h)(6)(ii) through (iv), inspectors should be aware that FRA is allowing exceptions to the minimum inspection frequencies for unscheduled detours, certain passenger trains, and items that are already inspected on a monthly basis pursuant to § 213.235. Each of these exceptions will be discussed in more detail below.

(i) Except as provided in paragraphs (h)(6)(ii) through (h)(6)(iv) of this section, track owners must specify that all CWR joints are inspected, at a minimum, in accordance with the intervals identified in the following table:

| Minimum Number of Inspections per Calendar Year ¹ | | | | | | | |
|--|--|-----------------|------------------------|--|---------------------------------|--|--|
| | Freight trains operating over track with an annual tonnage of: | | | Passenger trains operating over track with an annual tonnage of: | | | |
| | Less than 40 mgt | 40 to 60 mgt | Greater than 60 mgt | Less than 20 mgt | Greater than or equal to 20 mgt | | |
| Class 5 & above | 2 | 3^2 | 4^2 | 3^2 | 3^2 | | |
| Class 4 | 2 | 3^2 | 4^2 | 2 | 3^2 | | |
| Class 3 | 1 | 2 | 2 | 2 | 2 | | |
| Class 2 | 0 | 0 | 0 | 1 | 1 | | |
| Class 1 | 0 | 0 | 0 | 0 | 0 | | |
| Excepted track | 0 | 0 | 0 | n/a | n/a | | |

^{4 =} Four times per year, with one inspection in each of the following periods: January to March, April to June, July to September, and October to December; and with consecutive inspections separated by at least 60 calendar days.

Guidance: The first footnote provides that where a track owner operates both freight and passenger trains over a given segment of track, and there are two different possible inspection interval requirements, the more frequent inspection interval applies. This footnote was developed to address concerns over track shared by freight and passenger trains. It was anticipated that there could be a potential conflict with the inspection frequency required for

^{3 =} Three times per calendar year, with one inspection in each of the following periods: January to April, May to August, and September to December; and with consecutive inspections separated by at least 90 calendar days.

^{2 =} Twice per calendar year, with one inspection in each of the following periods: January to June and July to December; and with consecutive inspections separated by at least 120 calendar days.

^{1 =} Once per calendar year, with consecutive inspections separated by at least 180 calendar days.

¹ Where a track owner operates both freight and passenger trains over a given segment of track, and there are two different possible inspection interval requirements, the more frequent inspection interval apples.

² When extreme weather conditions prevent a track owner from conducting an inspection of a particular territory within the required interval, the track owner may extend the interval by up to 30 calendar days from the last day that the extreme weather condition prevented the required inspection.

the track if the track owner were to follow the chart for both types of trains. By requiring the more frequent inspections in situations of conflict, this footnote ensures greater safety and protection to track used for mixed purposes.

The second footnote was added in response to concerns regarding sensitivity of extreme regional weather conditions. Concern was raised with regard to the difficulty of inspecting CWR joints in northern regions when there is a large amount of snow. FRA notes that there could be times when it would be extremely difficult for a track owner to clear snow and ice from the joint in order for it to be seen for inspection. This footnote allows some flexibility for track owners in such a situation.

- (ii) Consistent with any limitations applied by the track owner, a passenger train conducting an unscheduled detour operation may proceed over track not normally used for passenger operations at a speed not to exceed the maximum authorized speed otherwise allowed, even though CWR joints have not been inspected in accordance with the frequency identified in paragraph (h)(6)(i) of this section, provided that:
- (A) All CWR joints have been inspected consistent with requirements for freight service; and (B) The unscheduled detour operation lasts no more than 14 consecutive calendar days. In order to continue operations beyond the 14-day period, the track owner must inspect the CWR joints in accordance with the requirements of paragraph (h)(6)(i) of this section.

Guidance: This paragraph allows track owners, for a limited period of time, to operate passenger trains without lowering the track speed and without adhering to the required inspection frequencies for passenger trains pursuant to the table in § 213.119(h)(6)(i). This provision accommodates for unplanned outages, derailments, accidents, and other emergency situations. Track owners are still required to adhere to the applicable freight inspection frequencies. This provision is intended to provide relief to railroads that operate passenger trains and that have a last-minute emergency situation. However, if a track owner operates passenger trains at the normal track speed for more than 14 days, the track must be inspected at the appropriate passenger train levels, as detailed in the chart at § 213.119(h)(6)(i).

(iii) Tourist, scenic, historic, or excursion operations, if limited to the maximum authorized speed for passenger trains over the next lower class of track, need not be considered in determining the frequency of inspections under paragraph (h)(6)(i) of this section.

Guidance: As defined in § 213.119(1), tourist, scenic, historic, or excursion operations are railroad operations that carry passengers with the conveyance of the passengers to a particular destination not being the principal purpose. These operations run less frequently than intercity or commuter passenger trains, and occur most often on shortline railroads. If a track owner has an operation of this type on the track and does not want to take that operation into account in determining inspection frequency, the owner must drop the track speed one class with regard to that operation. This way, the track owner will be still be in compliance with the inspection frequency mandated by the table in paragraph (h)(6)(i), regardless of the class of freight the owner runs on the track. As the first footnote to the table in paragraph (h)(6)(i) states, where there are two different possible inspection interval requirements, the more frequent inspection interval applies.

The above is a consideration for situations where tourist trains operate on the general system of transportation. For tourist trains on track other than the general system of transportation, such operations are normally not subject to the TSS. See Part 209, Appendix A.

(iv) All CWR joints that are located in switches, turnouts, track crossings, lift rail assemblies or other transition devices on moveable bridges must be inspected on foot at least monthly, consistent with the requirements in § 213.235; and all records of those inspections must be kept in accordance with the requirements in § 213.241. A track owner may include in its § 213.235 inspections, in lieu of the joint inspections required by paragraph (h)(6)(i) of this section, CWR joints that are located in track structure that is adjacent to switches and turnouts, provided that the track owner precisely defines the parameters of that arrangement in the CWR plans.

Guidance: This paragraph exempts the following items from the periodic inspection frequency intervals: switches, turnouts, track crossings, lift rail assemblies, or other transition devices on moveable bridges. Track owners already inspect these items on a monthly basis pursuant to § 213.235. Rather than apply the additional periodic inspection requirements (i.e., apply the intervals in the table in § 213.119(h)(6)(i) to switches and turnouts, etc.), FRA believes it is more appropriate to have track owners conduct their inspections of joints at these locations during their monthly § 213.235 inspections.

FRA has historically understood and operated under the assumption that a turnout extends from the point of the switch to the heel of the frog. Inspectors should continue to operate under that assumption, and accordingly, all joints in turnouts, switches, etc. must be inspected monthly, pursuant to § 213.235, and records of these inspections must be kept in accordance with § 213.241. The regulation does not require that the data elements listed in § 213.119(h)(7)(i) appear on the § 213.235 inspection record.

All joints that extend beyond the point of a switch or beyond the heel of the frog must be inspected at the frequency intervals identified in § 213.119(h)(6)(i). However, track owners are free to include, in their monthly § 213.235 inspection, these joints that are located in track structure that is adjacent to turnouts and switches. If track owners choose to do this, they must clearly define the parameters of that arrangement in their CWR plan. In other words, the track owner should clearly identify the physical limits of the adjacent track structure (e.g., insulated joints up until the signal), and they must clearly identify the inspection interval for joints in that adjacent track (e.g., "inspect all insulated joints to the signal during the monthly § 213.235 inspection").

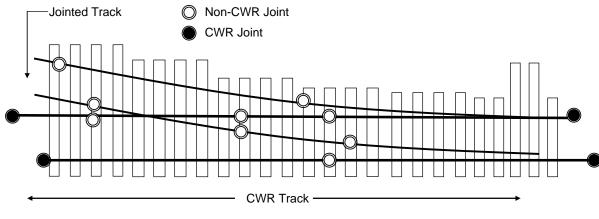


Figure 1

In addition, as long as track owners clearly define the parameters in the CWR plans, the track owner does not need to keep two sets of records (e.g., a record from the § 213.235 inspection and a record from the § 213.119(h)(6)(i) inspection) for inspections of these "adjacent" joints. For example, if the track owner's CWR plan indicates that joints in crossovers between turnouts must be inspected during the monthly § 213.235 inspection, and a railroad track inspector inspects the joints in the crossover during the monthly § 213.235 inspection, then it is sufficient for the track owner to create and maintain only the § 213.235 record.

FRA believes this option is useful because it avoids the confusion and duplication that might otherwise result. In addition, FRA notes that it would be burdensome for track inspectors to inspect those "adjacent" joints monthly and make a note of the inspection in the monthly § 213.235 record, and also be required to make an additional § 213.119(h)(6)(i) record every few months.

(7) Specify the recordkeeping requirements related to joint bars in CWR, including the following:

Guidance: This paragraph requires track owners to keep records specific to CWR joint bars. FRA has distinguished between two major categories of records that can be found in section (i)'s records pertaining to periodic and followup inspections and section (ii)'s fracture reports.

(i) The track owner shall keep a record of each periodic and follow-up inspection required to be performed by the track owner's CWR plan, except for those inspections conducted pursuant to § 213.235 for which track owners must maintain records pursuant to § 213.241. The record shall be prepared on the day the inspection is made and signed by the person making the inspection. The record shall include, at a minimum, the following items: the boundaries of the territory inspected; the nature and location of any deviations at the joint from the requirements of this part or of the track owner's CWR plan, with the location identified with sufficient precision that personnel could return to the joint and identify it without ambiguity; the date of the inspection; the remedial action, corrective action, or both, that has been taken or will be taken; and the name or identification number of the person who made the inspection.

Guidance: This paragraph addresses the inspection reports that have to be created after periodic inspections required by paragraph (h)(6)(i), and followup inspections as required by the track owner's CWR plan. The inspection reports of the periodic inspections shall be prepared on the day the inspection is made and are to contain the required information. The periodic inspection record can be combined with other records required pursuant to § 213.241.

(ii) The track owner shall generate a Fracture Report for every cracked or broken CWR joint bar that the track owner discovers during the course of an inspection conducted pursuant to §§ 213.119(g), 213.233, or 213.235 on track that is required under § 213.119(h)(6)(i) to be inspected.

Guidance: This paragraph requires railroads to generate Fracture Reports that are also required to be submitted to the Associate Administrator twice annually, pursuant to § 213.119(h)(7)(ii)(B). Railroads must complete Fracture Reports when they find cracks or breaks during routine inspections pursuant to §§ 213.119(g), 213.233, or 213.235, on track that is required to be inspected under § 213.119(h)(6)(i). FRA intends to use the Fracture Reports to collect CWR rail joint data; FRA does not intend to use the Fracture Reports for enforcement purposes. Inadvertent errors on Fracture Reports submitted by railroads employees should not be subject to civil penalties. Although, pursuant to § 213.119(h)(6)(i), track owners are not required to complete a Fracture Report for cracks or breaks found in excepted track, Class 1 track, and Class 2 track without passenger service, inspectors should encourage track owners to complete Fracture Reports whenever cracks or breaks are discovered, in addition to the required inspections.

If an FRA inspector encounters repeated failure to prepare and complete reports or comes upon a persistent and recurring pattern of non-reporting, inspectors are to inform their regional specialist of the non-reporting. The regional specialist will confer with Division staff to determine appropriate **enforcement** action. Track owners are not required to keep the Fracture Reports pursuant to the requirements of § 213.241. However, Fracture Reports should be kept until the track owner has received confirmation from headquarters that the data has been received.

FRA has provided four options as a means for the track owner to submit Fracture Reports. The first option is through an electronic data submission using Extensible Markup Language (XML) format. This option allows the railroad to decide how best to capture the information, yet still submit it to FRA in a standard and valid way. The railroads can submit the information to FRA by sending the XML files directly to FRA via email. The second option, the fillable PDF format, uses a fillable Adobe PDF file to capture and submit the data. The railroad can complete each report and submit the Adobe-generated XML file to FRA via a submit button located on the form. Third, FRA has made available a formatted Excel spreadsheet, into which railroads can input their Fracture Reports. This spreadsheet can be submitted via email, electronic media, or uploaded to the FRA Office of Safety Analysis' Web site. As a final option, FRA has made a printable version of the OMB-approved Fracture Report form available for download. See Appendix A to this compliance manual for an unofficial copy of the form; however, railroads wishing to submit the form in hard copy should use the fracture report form that is available for download, rather than this unofficial

copy. More specific instructions regarding submission of the report are available on the Office of Safety Analysis' Web site at the following address: http://safetydata.fra.dot.gov/CWR/.

(A) The Fracture Report shall be prepared on the day the cracked or broken joint bar is discovered. The Report shall include, at a minimum: the railroad name; the location of the joint bar as identified by milepost and subdivision; the class of track; annual million gross tons for the previous calendar year; the date of discovery of the crack or break; the rail section; the type of bar (standard, insulated, or compromise); the number of holes in the joint bar; a general description of the location of the crack or break in bar; the visible length of the crack in inches; the gap measurement between rail ends; the amount and length of rail end batter or ramp on each rail end; the amount of tread mismatch; the vertical movement of joint; and in curves or spirals, the amount of gage mismatch and the lateral movement of the joint.

Guidance: This paragraph requires that the Fracture Report be prepared on the day the cracked or broken CWR joint bar is found. The Fracture Report is to be completed whenever a cracked or broken joint bar is discovered during the periodic inspections required by § 213.119(h)(6)(i), as well as those currently required by §§ 213.233 and 213.235.

The annual million gross tonnage information requested in the Fracture Report can be entered on the report by another designated employee of the railroad, since the railroad track inspector may not have ready access to this information. However, the inspector should be made aware of the range within which the value falls as a result of instructions provided concerning the frequency of inspection required.

(B) The track owner shall submit the information contained in the Fracture Reports to the FRA Associate Administrator twice annually, by July 31 for the preceding six-month period from January 1 through June 30 and by January 31 for the preceding six-month period from July 1 through December 31.

Guidance: This paragraph requires the track owner to submit the information contained in the Fracture Reports twice annually to FRA. FRA is collecting the Fracture Report data and will review and analyze it to better determine the root causes of joint failures.

In addition, FRA inspectors will be expected to submit Fracture Reports when cracked or broken CWR joint bars are found during an inspection that are a defect or an exception to the railroad's CWR plan, in addition to noting the defect on their report. However, only one Fracture Report is to be submitted for a defective joint. An FRA inspection is not one of the required times that a railroad must submit a Fracture Report. However, the railroad may voluntarily complete the form; therefore, the FRA inspector would not complete and submit the form. Inspectors are to complete their reports on the fillable PDF form, which can be found on the FRA's Office of Safety Analysis Web site under the "CWR" toolbar tab. The submit button will email the Adobe-generated XML file to a predetermined address.

(C) After February 1, 2010, any track owner may petition FRA to conduct a technical conference to review the Fracture Report data submitted through December of 2009 and assess whether there is a continued need for the collection of Fracture Report data. The track owner shall submit a written request to the Associate Administrator, requesting the technical conference and explaining the reasons for proposing to discontinue the collection of the data.

Guidance: This paragraph allows any track owner to petition FRA after February 1, 2010, to conduct a technical conference to assess whether there is a continued need for the collection of Fracture Report data. During the technical conference, FRA would review the data collected and the analysis done to date, and determine if sufficient data has been collected to enable FRA to make a technically competent determination of CWR joint bar failure causes and contributing conditions.

(8) In lieu of the requirements for the inspection of rail joints contained in paragraphs (h)(1) through (h)(7) of this section, a track owner may seek approval from FRA to use alternate procedures.

Guidance: This paragraph permits a track owner to devise an alternate program for the inspection of joints in CWR. A track owner seeking to deviate from the minimum inspection frequencies specified in § 213.119(h)(6) should submit the alternate procedures and a supporting statement of justification to FRA's Associate Administrator. In the supporting statement, the track owner must include data and analysis that establishes (to the satisfaction of the Associate Administrator) that the alternate procedures provide at least an equivalent level of safety across the railroad.

If the Associate Administrator approves the alternate procedures, the Associate Administrator will notify the track owner of such approval in writing. In that written notification, the Associate Administrator will specify the date that the alternate procedures will become effective. After that date, the track owner shall comply with the approved procedures. If the Associate Administrator determines that the alternate procedures do not provide an equivalent level of safety, the Associate Administrator will disapprove the alternate procedures in writing. While a determination is pending with the Associate Administrator, the track owner shall continue to comply with the requirements contained in § 213.119(h)(6).

Technology (including frequent automated track geometry surveys) and sound CWR management, including prompt removal of "temporary" joints, may provide the additional information required to verify the ongoing integrity of joints in CWR. The alternative procedures provision of this final rule will allow track owners to take advantage of these new approaches as they become available.

- (i) The track owner shall submit the proposed alternate procedures and a supporting statement of justification to the Associate Administrator.
- (ii) If the Associate Administrator finds that the proposed alternate procedures provide an equivalent or higher level of safety than the requirements in paragraphs (h)(1) through (h)(7) of this section, the Associate Administrator will approve the alternate procedures by notifying the track owner in writing. The Associate Administrator will specify in the written notification

the date on which the procedures will become effective, and after that date, the track owner shall comply with the procedures. If the Associate Administrator determines that the alternate procedures do not provide an equivalent level of safety, the Associate Administrator will disapprove the alternate procedures in writing, and the track owner shall continue to comply with the requirements in paragraphs (h)(1) through (h)(7) of this section.

- (iii) While a determination is pending with the Associate Administrator on a request submitted pursuant to paragraph (h)(8) of this section, the track owner shall continue to comply with the requirements contained in paragraphs (h)(1) through (h)(7) of this section.
- (i) The track owner shall have in effect a comprehensive training program for the application of these written CWR procedures, with provisions for annual re-training, for those individuals designated under § 213.7(c) as qualified to supervise the installation, adjustment, and maintenance of CWR track and to perform inspections of CWR track. The track owner shall make the training program available for review by FRA upon request.

Guidance: All railroad employees designated under § 213.7(c) as qualified to supervise the installation, adjustment, and maintenance of CWR track and to perform inspections of CWR track must be trained on the track owner's CWR plan. The track owner shall maintain a written record of this training in accordance with § 213.7(d). Inspectors should refer any requests for training programs to their regional office. Railroad representatives agree to voluntarily make an initial submission of their CWR training programs to FRA. Track inspectors should not request the training program of a specific track owner unless under the specific direction of FRA management. Rather, FRA headquarters staff will undertake the responsibility of obtaining and disseminating this information, as needed, to both FRA inspectors and State inspectors participating in rail safety enforcement activities under Title 49 Code of Federal Regulations (CFR) Part 212. However, inspectors can request a copy of the track owner's qualification list during regular business hours.

- (j) The track owner shall prescribe and comply with recordkeeping requirements necessary to provide an adequate history of track constructed with CWR. At a minimum, these records must include:
- (1) Rail temperature, location, and date of CWR installations. Each record shall be retained for at least one year;
- (2) A record of any CWR installation or maintenance work that does not conform to the written procedures. Such record shall include the location of the rail and be maintained until the CWR is brought into conformance with such procedures; and
- (3) Information on inspection of rail joints as specified in paragraph (h)(7) of this section.

Guidance: Paragraph (j) contains the recordkeeping requirements for railroads that have track constructed of CWR. At a minimum, a track owner must keep records of the items listed in paragraphs (j)(1) through (j)(3). Paragraph (j)(1) requires each railroad to keep a record of the rail temperature, location, and date of the CWR installations. Paragraph (j)(2) requires a track owner to keep a record of any CWR installation or maintenance work that does not conform with the written procedures. Also, (f)(2) requires the railroad to determine the difference between the average rail temperature and the average rail neutral temperature. This necessitates the recording of rail neutral temperatures at rail repair locations that do not

conform to the procedures. Paragraph (j)(3) requires a track owner to keep records of information on inspection of rail joints as specified in paragraph (h)(7).

(k) The track owner shall make readily available, at every job site where personnel are assigned to install, inspect or maintain CWR, a copy of the track owner's CWR procedures and all revisions, appendices, updates, and referenced materials related thereto prior to their effective date. Such CWR procedures shall be issued and maintained in one CWR standards and procedures manual.

Guidance: Since the implementation of the CWR regulations, FRA has noted that a number of rail carriers maintain two different sets of CWR procedures. Additionally, some railroads have been maintaining the set of CWR procedures submitted to FRA as required by this section (§ 213.119), as well as a separate set of CWR procedures that is used by personnel in the field. While it may be acceptable for a railroad to instruct its personnel to maintain more restrictive CWR procedures in the field than what is on file with FRA, it is important to note that railroads must train their personnel on the plan formally submitted and filed with FRA. As FRA enforces the track owner's CWR plan on file with its Office of Railroad Safety, it is critical to have these procedures at every job site where personnel are assigned to install, inspect, or maintain CWR. Specifically, this will ensure that personnel in the field understand which set of procedures FRA will hold them responsible for compliance with the TSS.

(1) As used in this section—

Adjusting/de-stressing means the procedure by which a rail's temperature is re-adjusted to the desired value. It typically consists of cutting the rail and removing rail anchoring devices, which provides for the necessary expansion and contraction, and then re-assembling the track.

Annual re-training means training every calendar year.

Buckling incident means the formation of a lateral misalignment sufficient in magnitude to constitute a deviation from the Class 1 requirements specified in § 213.55. These normally occur when rail temperatures are relatively high and are caused by high longitudinal compressive forces.

Buckling-prone condition means a track condition that can result in the track being laterally displaced due to high compressive forces caused by critical rail temperature combined with insufficient track strength and/or train dynamics.

Continuous welded rail (CWR) means rail that has been welded together into lengths exceeding 400 feet. Rail installed as CWR remains CWR, regardless of whether a joint or plug is installed into the rail at a later time.

Corrective Actions mean those actions which track owners specify in their CWR plans to address conditions of actual or potential joint failure, including, as applicable, repair, restrictions on operations, and additional on-foot inspections. [1]

CWR joint means any joint directly connected to CWR.

Desired rail installation temperature range means the rail temperature range, within a specific geographical area, at which forces in CWR should not cause a buckling incident in extreme heat, or a pull-apart during extreme cold weather.

¹ Note, this term is used in § 213.119(h)(5).

Disturbed Track means the disturbance of the roadbed or ballast section, as a result of track maintenance or any other event, which reduces the lateral or longitudinal resistance of the track, or both.

Mechanical stabilization means a type of procedure used to restore track resistance to disturbed track following certain maintenance operations. This procedure may incorporate dynamic track stabilizers or ballast consolidators, which are units of work equipment that are used as a substitute for the stabilization action provided by the passage of tonnage trains.

Pull apart or stripped joint means a condition when no bolts are mounted through a joint on the rail end, rending the joint bar ineffective due to excessive expansive or contractive forces.

Pull-apart prone condition means a condition when the actual rail temperature is below the rail neutral temperature at or near a joint where longitudinal tensile forces may affect the fastenings at the joint.

Rail anchors means those devices which are attached to the rail and bear against the side of the crosstie to control longitudinal rail movement. Certain types of rail fasteners also act as rail anchors and control longitudinal rail movement by exerting a downward clamping force on the upper surface of the rail base.

Rail neutral temperature is the temperature at which the rail is neither in compression nor tension.

Rail temperature means the temperature of the rail, measured with a rail thermometer.

Remedial Actions mean those actions which track owners are required to take as a result of requirements of this part to address a non-compliant condition.

Tight/kinky rail means CWR which exhibits minute alinement irregularities which indicate that the rail is in a considerable amount of compression.

Tourist, scenic, historic, or excursion operations mean railroad operations that carry passengers with the conveyance of the passengers to a particular destination not being the principal purpose.

Track lateral resistance means the resistance provided by the rail/crosstie structure against lateral displacement.

Track longitudinal resistance means the resistance provided by the rail anchors/rail fasteners and the ballast section to the rail/crosstie structure against longitudinal displacement.

Unscheduled detour operation means a short-term, unscheduled operation where a track owner has no more than 14 calendar days' notice that the operation is going to occur.

Appendix A: CWR Joint Bar Fracture Report

 $(For\ Reference\ Purposes\ Only-Please\ use\ the\ official\ form\ available\ at:\ http://safetydata.fra.dot.gov/CWR/.)$

| CWR JOIN FRACTUR | | | TYPE OF INSPECTION □ PERIODIC JOINT INSPECTION (213.119[h][6][i]) □ TRACK INSPECTION (213.233) □ TURNOUT INSPECTION (213.235) □ OTHER (discovered during other than required inspection) | | | | |
|---|--|--|--|------------------|---------------------------------------|--|--|
| RAILROAD: | | SUBDIV | IVISION: MILEPOST: | | | | |
| DATE FOUND: | /20 | ANNUA | L MGT: | TRACK #: | TRACK CLASS: | | |
| ☐ TANGENT | ☐ CURVE degrees ☐ IN SPIRAL | | W/INNER RAIL RAIL SECTION(S):/ | | | | |
| ANNUAL JOINT I | NSPECTION FREQUENC | Y FOR THI | S SEGMENT | DATE OF LAST | JOINT INSPECTION: | | |
| □ 1x □ 2x □ 3 | x □ 4x □ OTHER: | | - | //20 | | | |
| BAR TYP | | | | ATED [| □ COMPROMISE □ 8 | | |
| F | IELD SIDE BAR | | | GAGE SID | E BAR | | |
| | OUGH Check location of NNER BOLT HOLE Output | | | | heck location of break: T HOLE OTHER | | |
| □ TOP CENTED □ BOTTOM CE □ INNER BOLT □ OTHER BOL □ OTHER (desc | ENTER T HOLE T HOLE | _ inches _ inches _ inches _ inches | CRACKED Check location(s) and record length(s): □ TOP CENTER | | | | |
| GAP BETWEE | N RAIL ENDS | | _ INCHES | | | | |
| | TTER OR RAMP | | | (Figures 1 and 2 | | | |
| | | | INCHES HIGH INCHES LONG INCHES HIGH INCHES LONG | | | | |
| TREAD MISM | | | _ INCHES _ INCHES | | NCHES LUNG | | |
| | CAL MOVEMENT | _ INCHES | (1 Iguic 3) | | | | |
| IF JOINT IN C | CURVE or SPIRAL: (Figure 4) | | INCHES | OUT | INCHES | | |
| LONG | \ U | | _ | | | | |
| GAGE MISMATCH (Figure 5) | | | INCHES | | | | |
| JOINT LATERAL MOVEMENT INCHES | | | | | | | |
| OTHER COMM | MENTS: | | | | | | |
| | | | | | | | |

FRACTURE REPORT INSTRUCTIONS

TYPE OF INSPECTION – Indicate the type of inspection being performed when fracture was found. At least one (1) box in group must be checked.

RAILROAD – FRA railroad reporting code, (*e.g.* CSX or NS). Four (4) character alpha. **SUBDIVISION** – Railroad's subdivision or district. If none enter "system". Fourteen (14) character alphanumeric. ¹

MILEPOST – Railroad's designated milepost at the location of the fracture. 7.2 character alphanumeric, *e.g.*, ABC1234.56.¹

DATE FOUND – Date the fracture was found. Eight (8) character numeric, MMDDYYYY. **ANNUAL MGT** – Million Gross Tons (from previous year) for the specific track with the fracture. 4.1 numeric, *e.g.*, 123.4 (allowable range 0 to 999.9 inclusive).

TRACK CLASS – FRA Class for track with the fracture. One (1) character numeric, *e.g.*, 3 (allowable range 2 - 6 inclusive).

TANGENT/CURVE/SPIRAL/INNER/OUTER – Indicate whether fracture found on tangent, curve (include degree of curvature) or spiral and if inner or outer rail, if applicable. If tangent, check TANGENT. Otherwise check CURVE or SPIRAL and INNER or OUTER. If curve checked, curvature entered as 2.1 numeric, *e.g.* 2.5.

RAIL SECTION – Indicate each rail section comprising the joint, (*e.g.* for a standard bar, enter 136 or for a compromise bar, enter 132/115).

ANNUAL JOINT INSPECTION FREQUENCY – Number of times per year that walking joint bar inspection is performed. Two (2) character numeric, e.g. 3 (allowable range 1-12 inclusive).

DATE OF LAST JOINT BAR INSPECTION – Date the last walking joint bar inspection was performed. Eight (8) character numeric, MMDDYYYY.

BAR TYPE/HOLES – Indicate bar type: standard, insulated, or compromise bar and number of holes. Two (2) boxes (one in each group) must be checked.

BROKEN THROUGH – For each bar, field and gage, check appropriate box if broken completely through and indicate the location of the break (through center, through inner bolt hole or other location). For each bar, field and gage, there is no requirement to check any box(es) – neither bar is broken through.

CRACKED – For each bar, field and gage, indicate the crack location(s) and corresponding length(s). For each bar, field and gage, any number of boxes may be checked. If box is checked, crack length is 3.1 numeric, *e.g.*, 2.5. If OTHER is checked, text description can be 64 (128) character alpha-numeric.

GAP BETWEEN RAIL ENDS – Measure and record the distance between the rail ends. If joint is pulled apart or separated, estimate the gap prior to separation. 5.2 numeric, *e.g.* 10.25.

RAIL END BATTER OR RAMP - Measure and record the *height and length of the batter or ramp for each rail end* and record even if found to be zero. See Figures 1 and 2 for method of measurement. Check appropriate boxes (one each of NORTH or EAST and one each of SOUTH or WEST) and enter batter ramp as four (4) 4.2 numeric, *e.g.*, 1.25.

TREAD MISMATCH – Measure and record the tread mismatch. See Figure 3 for method of measurement. 4.2 numeric, *e.g.*, 1.25.

JOINT VERTICAL MOVEMENT – Record the vertical movement of the rail joint (not track surface) according to 213.13. 4.2 numeric, *e.g.*, 1.25.

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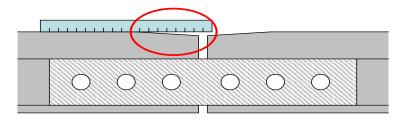
¹ This format has been pre-established in FRA's RISPC system for its safety inspectors.

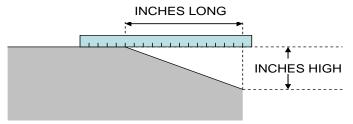
GAGE RAMP – In curves only, measure and record the gage ramp distance out and length. See Figure 4 for method of measurement. Two (2) 4.2 numeric, *e.g.*, 1.25.

GAGE MISMATCH – In curves only, measure and record the gage mismatch. See Figure 5 for method of measurement. 4.2 numeric, *e.g.*, 1.25.

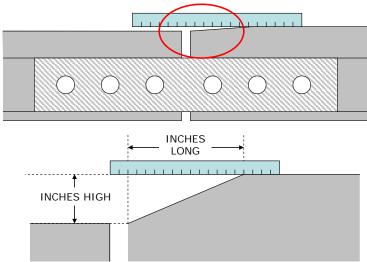
JOINT LATERAL MOVEMENT – In curves only, record the lateral movement of the rail joint (not gage) according to 213.13. 4.2 numeric, *e.g.*, 1.25.

OTHER COMMENTS: - Other comments, including any other factors or conditions that may have contributed to the fracture of the bar(s). 256 character alphanumeric.

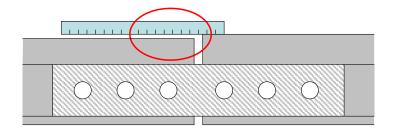


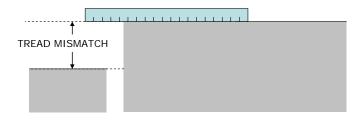


CWR Joint Bar Fracture Report - Figure 1 Method for measuring RAIL END BATTER. Measurement to be made on each rail end. (NOT TO SCALE)

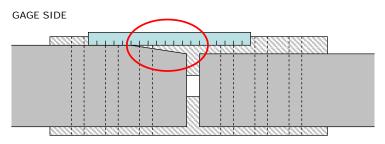


CWR Joint Bar Fracture Report - Figure 2. Method for measuring RAIL END RAMP. (NOT TO SCALE)

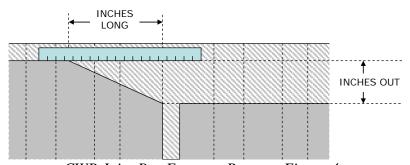




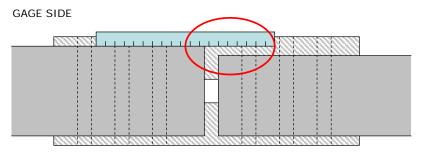
CWR Joint Bar Fracture Report - Figure 3 Method for measuring TREAD MISMATCH. (NOT TO SCALE)



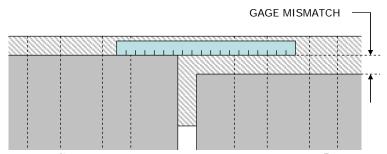
FIELD SIDE



CWR Joint Bar Fracture Report - Figure 4
Method for measuring GAGE RAMP.
(NOT TO SCALE)



FIELD SIDE



CWR Joint Bar Fracture Report - Figure 5.
Method for measuring GAGE MISMATCH.
(NOT TO SCALE)
Figure 2

Appendix B: Amendments to Part 213—Schedule of Civil Penalties

Appendix B to Part 213 was amended by the CWR final rule (74 FR 42988 (August 25, 2009)) by adding an entry for § 213.118 and revising the entry for § 213.119 to read as follows:

Appendix B to Part 213—Schedule of Civil Penalties

| | Section | Violation | Willful violation ¹ |
|---------|--|-----------|-----------------------------------|
| 213.118 | Continuous welded rail plan (a) through (e) Continuous welded rail plan contents (a) through (k) | 5,000 | 7,500 |
| 213.119 | | 5,000 | 7,500 |

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¹ A penalty may be assessed against an individual only for a willful violation. The FRA Administrator reserves the right to assess a penalty of up to \$100,000 for any violation where circumstances warrant. *See* 49 CFR Part 209, Appendix A.

Appendix C: Defect and Activity Code Logic Table

| CFR | RULE | SUBRULE | DESCRIPTION | Effect Date | End Date | ACTIVITY |
|-----|------|---------|--|-------------|-----------|--------------------------------------|
| 213 | 0118 | A1 | FAILURE OF TRACK OWNER TO DEVELOP AND IMPLEMENT WRITTEN CWR PROCEDURES. | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0118 | A2 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES. | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0118 | A3 | FAILURE OF TRACK OWNER TO DEVELOP A TRAINING PROGRAM FOR THE IMPLEMENTATION OF THEIR WRITTEN CWR PROCEDURES. | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0118 | С | FAILURE OF TRACK OWNER TO COMPLY WITH EXISTING CWR PLAN | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0118 | E1 | FAILURE OF TRACK OWNER TO FILE A REVISED CWR PLAN WITH ASSOCIATE ADMINISTRATOR OF SAFETY/CHIEF OPERATING OFFICER WITH 30 DAYS OF REVISION. | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0118 | E2 | FAILURE OF TRACK OWNER TO RE-SUBMIT A CONFORMING PLAN WITHIN 30 DAYS OF RECEIPT OF FINAL SUBMISSION DECISION. | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0119 | 01 | FAILURE OF TRACK OWNER TO DEVELOP AND IMPLEMENT WRITTEN CWR PROCEDURES. | 01-Jun-02 | 26-Sep-11 | CWRP |
| 213 | 0119 | 02 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES. | 01-Jun-02 | 15-Aug-06 | CWRP,MTH,MTW,RXM,RXY,TOM,TOY,YTH,YTW |
| 213 | 0119 | 02 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES. | 16-Aug-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 03 | FAILURE OF TRACK OWNER TO DEVELOP A TRAINING PROGRAM FOR THE IMPLEMENTATION OF THEIR WRITTEN CWR PROCEDURES. | 01-Jun-02 | 26-Sep-11 | CWRP |

| CFR | RULE | SUBRULE | DESCRIPTION | Effect Date | End Date | ACTIVITY |
|-----|------|---------|---|-------------|-----------|-----------|
| 213 | 0119 | 04 | FAILURE TO KEEP CWR RECORDS AS REQUIRED. | 01-Jun-02 | 26-Sep-11 | CWRP,TREC |
| 213 | 0119 | 05 | FAILURE OF TRACK OWNER TO INSTITUTE REQUIRED PROVISIONS FOR INSPECTING JOINTS IN CWR. | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 06 | FAILURE TO RECORD THE LOCATION OF, CONDITIONS OF, AND REMEDIAL ACTION FOR JOINTS IN CWR, AS REQUIRED. | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 07 | FAILURE TO INSPECT JOINTS IN CWR AT REQUIRED FREQUENCY | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 08 | RAILROAD USING ALTERNATE METHODS TO INSPECT JOINTS IN CWR WITHOUT SEEKING APPROVAL FROM FRA. | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 09 | RAILROAD USING ALTERNATE METHODS TO INSPECT JOINTS IN CWR BEFORE APPOROVAL HAS BEEN GRANTED. | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 10 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - ANCHORING REQUIREMENTS | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 11 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - RAIL NEUTRAL TEMPERATURE | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 12 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - MONITORING PROCEDURES | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 13 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - TRAIN SPEED | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 14 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - INSPECTION PROCEDURES | 01-Jul-06 | 26-Sep-11 | CWRP |
| 213 | 0119 | 01 | FAILURE TO KEEP CWR RECORDS AS REQUIRED. | 27-Sep-11 | 31-Dec-20 | CWRP,TREC |
| 213 | 0119 | 02 | FAILURE OF TRACK OWNER TO INSTITUTE REQUIRED PROVISIONS FOR INSPECTING JOINTS IN CWR. | 27-Sep-11 | 31-Dec-20 | CWRP |

| CFR | RULE | SUBRULE | DESCRIPTION | Effect Date | End Date | ACTIVITY |
|-----|------|---------|---|-------------|-----------|----------|
| 213 | 0119 | 03 | FAILURE TO RECORD THE LOCATION OF, CONDITIONS OF, AND REMEDIAL ACTION FOR JOINTS IN CWR, AS REQUIRED. | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0119 | 04 | FAILURE TO INSPECT JOINTS IN CWR AT REQUIRED FREQUENCY | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0119 | 05 | RAILROAD USING ALTERNATE METHODS TO INSPECT JOINTS IN CWR WITHOUT SEEKING APPROVAL FROM FRA. | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0119 | 06 | RAILROAD USING ALTERNATE METHODS TO INSPECT JOINTS IN CWR BEFORE APPOROVAL HAS BEEN GRANTED. | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0119 | 07 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - ANCHORING REQUIREMENTS | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0119 | 08 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - RAIL NEUTRAL TEMPERATURE | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0119 | 09 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - MONITORING PROCEDURES | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0119 | 10 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - TRAIN SPEED | 27-Sep-11 | 31-Dec-20 | CWRP |
| 213 | 0119 | 11 | FAILURE TO COMPLY WITH WRITTEN CWR PROCEDURES - INSPECTION PROCEDURES | 27-Sep-11 | 31-Dec-20 | CWRP |